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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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KING & SPALDING LLP
1180 PEACHTREE STREET
ATLANTA, GA 30309-3521

EXAMINER

GAKH, YELENA G

ART UNIT	PAPER NUMBER
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1797

MAIL DATE	DELIVERY MODE
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12/28/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/751,368

Applicant(s)

STOCKMAN ET AL.

Examiner

Yelena G. Gakh, Ph.D.

Art Unit

1797

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 29 October 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-28 is/are pending in the application.
- 4a) Of the above claim(s) 3,5-8,10,11,14,15,17,20,21 and 23-28 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,2,4,9,12,13,16,18,19 and 22 is/are rejected.
- 7) ☒ Claim(s) 18,19 and 22 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date 04/08/05.
- 4) ☒ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____.

DETAILED ACTION

1. Election of inventions and species filed on 10/29/07 is acknowledged. The Applicants elected Group I and regarding species - Group A, claims 3-5. However, there was a misunderstanding of the examiner's restriction requirements for the species election; the restriction assumed election of species from each group. The examiner called the Applicants regarding this misunderstanding and the Applicants corrected the election during Interview on 12/19/07 (Interview Summary is attached). All withdrawn claims were rejoined.

The current election of the species is as following: from Group A (1): claim 4 (which withdraws group 2); from Group 3: claim 9; from Group 4: claim 16; from Group 5: claim 18 (which obviously has the wrong dependency from claim 15 instead of claim 16); from Group 6: claim 19, and from Group 7: claim 22.

Thus, claims 1-28 are pending in the application. Claims 3, 5-8, 10-11, 14-15, 17, 20-21 and 23-28 are withdrawn from consideration.

Claims 1-2, 4, 9, 12-13, 16, 18-19 and 22 are considered on merits.

Claim Objections

2. Claim 18 is objected to because of the following informalities: the claim has the wrong dependency from claim 15, which should be changed to claim 16. Appropriate correction is required.

3. Claims 19 and 22 are objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. The claims recite the limitations for "transition frequency" and "the energy source", which are not the structural elements of the apparatus recited in the body of the parent claim.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-2, 4, 9, 12-13, 16, 18-19 and 22 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1 recites "an active medium, having a transition frequency and having at least one object having significant dipole oscillator strength". The expression is not clear and definite, since it is not apparent, as to what the active medium might be, since any medium has some transition frequency. It is not clear, whether the active medium is comprised of the objects with "significant dipole oscillator strength", or this is an active medium comprised of some material, that additionally contains such objects? Furthermore, it is not apparent, as to what the "objects with significant dipole oscillator strength" are, since too many molecular objects possess dipoles, and the term "significant" is a relative term. Therefore, the second structural element of the apparatus is not defined.

As for the recitation after the word "wherein", it does not provide a clear structural limitation to the structure or the materials of the two structural elements recited in the claim.

Moreover, it is not apparent, as to what the expression "the transition of the at least one object" might be. Where is the object transitioned? Was the expression meant to recite "excitation of the resonance frequency of the object"? Also, it is not clear, how transition of the object can stimulate emission of the surface plasmon? The whole expression is not clear.

From claims 9 and 19 it is not apparent, as to how the recitation of the claims further limits the structure recited in the parent claim.

In claim 18 it is not clear, which type of organic molecules is meant in the claim. Do they have a specific function; are they of any specific origin? The recitation of the claim renders it unclear and indefinite. It is further unclear, as to what is meant by the term "including" in the claim. Does it recite a nanocrystal, or a nanocrystal covered with a layer of organic molecules?

A broad range or limitation together with a narrow range or limitation that falls within the broad range or limitation (in the same claim) is considered indefinite, since the resulting claim does not clearly set forth the metes and bounds of the patent protection desired. See MPEP §

2173.05(c). Note the explanation given by the Board of Patent Appeals and Interferences in *Ex parte Wu*, 10 USPQ2d 2031, 2033 (Bd. Pat. App. & Inter. 1989), as to where broad language is followed by "such as" and then narrow language. The Board stated that this can render a claim indefinite by raising a question or doubt as to whether the feature introduced by such language is (a) merely exemplary of the remainder of the claim, and therefore not required, or (b) a required feature of the claims. Note also, for example, the decisions of *Ex parte Steigewald*, 131 USPQ 74 (Bd. App. 1961); *Ex parte Hall*, 83 USPQ 38 (Bd. App. 1948); and *Ex parte Hasche*, 86 USPQ 481 (Bd. App. 1949). In the present instance, claim 18 recites the broad recitation a nanocrystal, and the claim also recites "a nanocrystal with a layer of organic molecules" which is the narrower statement of the range/limitation.

Claim 22 does not seem to relate to the parent claim, since the parent claim does not recite an optical energy source as a part of the apparatus.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

6. **Claims 1-2, 4, 9, 12-13, 16, 18-19 and 22** are rejected under 35 U.S.C. 102(a) as being anticipated by Kulakovich et al. (NanoLetters, 2002) (Kulakovich).

Kulakovich discloses an apparatus comprising a resonant medium having at least one surface plasmon mode therein (gold nanoparticles) and the active medium comprised of quantum dots in form of (CdSe)ZnS nanocrystals (see Abstract). "The spherical monodisperse colloidal gold nanoparticles exhibit a well-defined plasmon resonance around 550 nm [visible light], which can be used to excite resonantly the (CdSe)ZnS nanocrystals" (page 1449, right column). Quantum dots are cover with sodium mercaptoethylsulfonate (SMRES) (see page 1450, left column).

7. **Claims 1-2, 9, 12-13, 16, 18-19 and 22** are rejected under 35 U.S.C. 102(a) as being anticipated by Shimizu et al. (Phys. Rev. Lett, Sept. 2002) (Shimizu).

Shimizu discloses and an apparatus comprising a resonant medium having at least one surface plasmon mode therein (rough gold film) and the active medium comprised of quantum dots in form of (CdSe)ZnS nanocrystals (see Abstract and page 117401-1, right column). According to the Abstract: "the fluorescence behavior of single CdSe(ZnS) core-shell nanocrystal (NC) quantum dots is dramatically affected by electromagnetic interactions with a rough metal film. Observed changes including a fivefold increase in the observed fluorescence intensity of single NCs, a striking reduction in their fluorescence blinking behavior, complete conversion of the emission polarization to linear, and single NC excitation lifetimes that are 10^3 times faster. The enhanced excited state decay process for NCs coupled to rough metal substrates effectively competes with the Auger relaxation process, allowing us to observe both charged and neutral exciton emission from these N quantum dots". "Single NCs were dispersed by spin-coating dilute samples directly on the gold substrates, and the 514 nm line [visible range or electromagnetic spectrum] of an Ar ion cw laser was used for sample excitation" (page 117401-1, right column).

Conclusion

8. The relevant art made of record and not relied upon is considered pertinent to applicant's disclosure. *Gryczynski et al. (J. Phys. Chem. B, 2005)*, disclose "Surface-plasmon Coupled Emission of Quantum Dots" (Title).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Yelena G. Gakh, Ph.D. whose telephone number is (571) 272-1257. The examiner can normally be reached on 9:30 am - 6:00 pm.


If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jill A. Warden can be reached on (571) 272-1267. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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12/21/2007


YELENA GAKH
PRIMARY EXAMINER